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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,256	02/12/2004	Franz Cemic	038664.49970D1	4161

23911 7590 07/26/2004

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EXAMINER	
LAVARIAS, ARNEL C	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/776,256	CEMIC ET AL.	
	Examiner	Art Unit	
	Arnel C. Lavarias	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/12/04,2/12/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,4,7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3,4,7 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/893,998.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/12/04,7/12/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. The Examiner notes that the pending claims in the instant application, i.e. Claims 3-4, 7-8, are drawn to Species II, a coordinate measuring instrument including an illumination device, the instrument comprising a light source and wherein the light from the light source is picked off via the coupling-in optical system having a large numerical entrance aperture and is coupled into the optical fiber bundle, as set forth in the restriction requirement on 4/14/03 of the parent 09/893998 application. Thus, the claims drawn to Species II will be examined in the instant application.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/893998, filed on 6/29/01. ***Information Disclosure Statement***

3. The PTO-892 form submitted as part of the information disclosure statement dated 2/12/04 is not a proper submission for providing citations of applicable prior art. This PTO-892 form has been marked 'VOID'. It is noted that the cited references listed on the PTO-892 form are properly listed on an information disclosure statement dated 7/12/04.

Drawings

4. The drawings were received on 2/12/04. These drawings are acceptable.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within *the range of 50 to 150 words*. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because of the following informalities:

Abstract is too long.

Abstract, line 21- delete '(FIG. 1)'.

Correction is required. See MPEP § 608.01(b).

Claim Objections

7. Claims 3-4, 8 are objected to because of the following informalities:

Claim 3, line 18; Claim 8, line 17- 'couplingin' should read 'coupling in'

Claim 4, line 19; Claim 8, line 17- '> _' should read '≥'.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claim 3 is rejected under 35 U.S.C. 102(e) as being anticipated by Tsuji (U.S. Patent No. 6285855), of record.

Tsuji discloses an illumination device (See for example Figures 3A, 3B, 6) having a light source (See 1 in Figure 6); an optical waveguide (See 4 in Figure 6); a coupling-in optical system which couples the light of the light source into a first end of the waveguide (See 91, 92, 2, 3 in Figure 6); a coupling-out optical system which couples out the light emerging from a second end of the optical waveguide (See 5 in Figure 6); and an illumination optical system (See 93 in Figure 6) which receives the light emerging from the coupling-out optical system and illuminates an imaging field (See 94 in Figure 6), the illumination device further comprising an optical fiber bundle which is arranged as the optical waveguide (See 4 in Figure 6; col. 4, line 43-col. 5, line 28); and a homogenizing optical system which is arranged between the coupling-out optical system and the illuminating optical system (See 7 in Figure 6), wherein the homogenizing optical system homogenizes the nonuniform intensity distribution in the image field of the light emerging from the optical fiber bundle (See col. 5, lines 29-43), wherein the light of the light source is picked off via the coupling-in optical system (See 2a, 2b, 3, 4 in Figures 3A and 3B; 1, 91, 92, 2, 3, 4 in Figure 6) having a large numerical entrance aperture (See

col. 7, line 49-col. 8, line 48) and is coupled into the optical fiber bundle. It is noted that the numerical aperture is defined as the product of half angle acceptance cone of the optical element and the refractive index of the medium in which the acceptance cone is in. Thus, in the instant case, the numerical aperture is $NA = n \cdot \sin(\theta) = \sin(\frac{\varepsilon b}{2})$ for Figure 3B, for example.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji in view of Pedrotti et al. (F. L. Pedrotti, L. S. Pedrotti, 'Introduction to Optics', Prentice Hall, New Jersey, 1993, pp. 135-139.).

Tsuji discloses the invention as set forth above in Claim 3, except for the numerical entrance aperture being greater than 0.60. However, Tsuji further addresses increasing the emission angle ε from a smaller value εa to a larger value εb, thus increasing the numerical aperture (See col. 7, line 49-col. 8, line 48). Further, it is well known in the art to utilize lenses or groups of lenses to obtain a high numerical aperture. For example, Pedrotti et al. teaches that typical numerical apertures for lens groups such as microscope objectives may range from 0.08-1.3, with 0.05, 0.1, 0.2, 0.4, 0.6, and 0.8 being extremely

common for non-immersed lenses. Pedrotti et al. further teaches that high numerical aperture lenses impart particular advantages to the optical system, including higher image brightness, greater resolving power, and shorter working distance. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the numerical entrance aperture of the coupling-in optical system be greater than 0.60, as taught by Pedrotti et al., in the illumination device of Tsuji, for the purpose of increasing image brightness and resolving power of the illumination device.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. Patent No. 6456377 or Suzuki '377), of record, in view of Suzuki (U.S. Patent No. 5608575 or Suzuki '575), of record, and Tsuji.

Suzuki '377 discloses an exposure system, which incorporates a coordinate measuring instrument including an illumination device (See for example Figures 1-2), the coordinate measuring device having a horizontally X-Y displaceable measurement stage (See 50 in Figure 1) for receiving a substrate (See W in Figure 1; or 62 in Figure 2) with a feature (See 64 in Figure 2; col. 14, line 58-col. 15, line 28) that is to be measured; an illumination system; and a detector device for determining the position of the feature (See 100 in Figure 1; 70 in Figure 2); and the illumination device having a light source (See 12, 14 in Figure 1), and an illumination optical system (See 40a, 40b, PL in Figure 1) which receives the light emerging from the light source and illuminates an imaging field; the illumination device further comprising a homogenizing optical system which is arranged between the light source and the illuminating optical system (See 16 in Figure 1), wherein the homogenizing optical system homogenizes the nonuniform intensity

distribution in the image field of the light emerging from the light source (See col. 9, line 66-col. 10, line 47; col. 14, lines 27-50). Suzuki '377 lacks an optical fiber bundle; a coupling-in optical system having a large numerical entrance aperture and which couples the light of the light source into a first end of the waveguide; and a coupling-out optical system which couples out the light emerging from a second end of the optical waveguide. However, Suzuki '575 teaches a similar exposure system, including an illumination device (See Figure 4), the device having a horizontally X-Y displaceable measurement stage (See 45 in Figure 4) for receiving a substrate with a feature that is to be measured (See 43 in Figure 4); an illumination system; and a detector device (See 47, 48 in Figure 4); and the illumination device having a light source (See 11, 12 in Figure 4); an optical waveguide (See 15 in Figure 4); a coupling-in optical system having a numerical entrance aperture (It is noted that although this feature is not specifically shown in Figure 4, this feature is inherent to the coupling-in optical system such that light may pass into the coupling-in optical system) and which couples the light of the light source into a first end of the waveguide (See 12, 13, 14 in Figure 4); a coupling-out optical system which couples out the light emerging form a second end of the optical waveguide (See 16a, 16b, 17, 18 in Figure 4); and an illumination optical system (See 28, 42 in Figure 4) which receives the light emerging from the coupling-out optical system and illuminates an imaging field (See 41, 46a, 46b, 43 in Figure 4); the illumination device further comprising an optical fiber bundle which is arranged as the optical waveguide (See 15 in Figure 4; col. 10, lines 35-58); and a homogenizing optical system which is arranged between the coupling-out optical system and the illuminating optical system (See 19 in

Figure 4), wherein the homogenizing optical system homogenizes the nonuniform intensity distribution in the image field of the light emerging from the optical fiber bundle (See col. 10, line 59-col. 11, line 35). The combined teachings of Suzuki '377 and Suzuki '575 lack the numerical entrance aperture of the coupling-in optical system being large. However, Tsuji teaches an illumination device (See for example Figures 3A, 3B, 6) having a light source (See 1 in Figure 6); an optical waveguide (See 4 in Figure 6); a coupling-in optical system which couples the light of the light source into a first end of the waveguide (See 91, 92, 2, 3 in Figure 6); a coupling-out optical system which couples out the light emerging from a second end of the optical waveguide (See 5 in Figure 6); and an illumination optical system (See 93 in Figure 6) which receives the light emerging from the coupling-out optical system and illuminates an imaging field (See 94 in Figure 6), the illumination device further comprising an optical fiber bundle which is arranged as the optical waveguide (See 4 in Figure 6; col. 4, line 43-col. 5, line 28); and a homogenizing optical system which is arranged between the coupling-out optical system and the illuminating optical system (See 7 in Figure 6), wherein the homogenizing optical system homogenizes the nonuniform intensity distribution in the image field of the light emerging from the optical fiber bundle (See col. 5, lines 29-43), wherein the light of the light source is picked off via the coupling-in optical system (See 2a, 2b, 3, 4 in Figures 3A and 3B; 1, 91, 92, 2, 3, 4 in Figure 6) having a large numerical entrance aperture (See col. 7, line 49-col. 8, line 48) and is coupled into the optical fiber bundle. It is noted that the numerical aperture is defined as the product of half angle acceptance cone of the optical element and the refractive index of the medium in which the acceptance cone is

in. Thus, in the instant case, the numerical aperture is $NA = n \cdot \sin(\theta) = \sin(\frac{\varepsilon b}{2})$ for Figure 3B, for example. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the device of Suzuki '377 further include an optical fiber bundle; a coupling-in optical system having a large numerical entrance aperture and which couples the light of the light source into a first end of the waveguide; and a coupling-out optical system which couples out the light emerging from a second end of the optical waveguide, as taught by Suzuki '575 and Tsuji, for the purpose of 1) diffusing the light emitted from the light source, while allowing ease in alignment in routing the light within the optical system, and 2) maximizing light throughput through the optical system.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki '377 in view of Suzuki '575 and Tsuji as applied to Claim 7 above, and further in view of Pedrotti et al.

Suzuki '377 in view of Suzuki '575 and Tsuji discloses the invention as set forth above in Claim 7, except for the numerical entrance aperture being greater than 0.60. However, Tsuji further addresses increasing the emission angle ε from a smaller value εa to a larger value εb, thus increasing the numerical aperture (See col. 7, line 49-col. 8, line 48 of Tsuji). Further, it is well known in the art to utilize lenses or groups of lenses to obtain a high numerical aperture. For example, Pedrotti et al. teaches that typical numerical apertures for lens groups such as microscope objectives may range from 0.08-1.3, with 0.05, 0.1, 0.2, 0.4, 0.6, and 0.8 being extremely common for non-immersed lenses. Pedrotti et al. further teaches that high numerical aperture lenses impart particular

advantages to the optical system, including higher image brightness, greater resolving power, and shorter working distance. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the numerical entrance aperture of the coupling-in optical system be greater than 0.60, as taught by Pedrotti et al., in the coordinate measuring instrument of Suzuki '377 in view of Suzuki '575 and Tsuji, for the purpose of increasing image brightness and resolving power of the optical device.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arnel C. Lavarias
7/21/04

THONG NGUYEN
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